

Volume III.

December 1, 1897.

No. 12.

The Forester,

An Illustrated Monthly Journal of Forestry

Devoted to the Conservation of Forests, the Proper Utilization of Forest Products, the Forestation of Waste-Lands and the Preservation of Game.

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Subscribers and exchanges will please note that THE FORESTER has changed hands. Henceforth this journal will be conducted by the American Forestry Association. Please address all communications and exchanges to THE FORESTER, 73 Corcoran Building, Washington, D. C.

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A COCO-NUT PALM IN THE CLUTCHES OF A WILD-FIG
IN A WEST INDIA FOREST.



A MANGROVE SWAMP ON THE COAST OF FLORIDA.

THE FORESTER.

VOLUME III.

DECEMBER 1, 1897.

NO. 12.

THE FORESTER.

An Illustrated Monthly Journal of Forestry.

THE FORESTER contains articles pertaining to all branches of Forestry: The Prevention and Extinguishment of Forest Fires, Improved Methods of Cutting, Useful and Injurious Insects and Fungi, Useful Birds, the Establishment of City Forests, State and Federal Reservations, Water Supply, Forest Legislation, Forest Influences, Forest Utilization, Forest Products, Road Construction, Reclamation of Waste Lands, etc., etc.

Important Notices.

With this issue this journal changes hands. In the future it will be published by the American Forestry Association. All subscribers and exchanges will please note the change of address, and send all periodicals and communications to THE FORESTER, 73 Corcoran Building, Washington, D. C.

MR. JOHN HALL, of Atlantic City, has been elected Secretary of the New Jersey Forestry Association, to fill the vacancy caused by the resignation of John Gifford. Members will please send all communications in reference to the Association to Mr. John Hall, editor of the *Daily Union*, Atlantic City, N. J., and all communications in reference to this journal to THE FORESTER, 73 Corcoran Building, Washington, D. C.

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MUCH could be said of the great land former—the mangrove tree, which, supplementing the work of the coral-polyp, has added to the warm seashore regions of the globe immense areas of land. The frontispiece of this issue shows a mangrove swamp on the shores of Florida, where it abounds. These trees grow in salt water several feet in depth, their labyrinth of roots and branches collects and holds sediment and flotage. Thus the shore-line advances.

The seeds of the mangrove germinate while still attached to the parent plant. These plantlets fall into the water, float away until their roots touch the bottom, to which they at once fix themselves. Detritus accumulates, birds, wind and water bring seeds, and soon the island is richly covered with vegetation and fit for human habitation.

What the mangrove does for the salt waters of the South the willow, the Cinderella of trees, accomplishes along the shores of rivers and other bodies of fresh water in northern latitudes. Although at times covered with water, it holds the soil of banks and constantly catches the sediment.

IN an apparently peaceful landscape there are countless struggles. Animals of all kinds are constantly fighting and devouring not only other kinds but their own kin. In every instance the fittest survives. So with trees. They are constantly struggling with one another for room, sunshine and soil. The weaker, although it may be commercially a supe-

rior kind, perishes. These worthless but powerful and persistent species are forest weeds, and the forester must know them and fight them just as a farmer combats the weeds in his fields. In reckless systems of lumbering the choicest trees are cut and the land abandoned to these forest weeds. The forester favors the valuable kinds, studying how every species disports itself in combination with other species, eradicating the wolves and protecting the sheep of the tree world. The frontispiece of this issue shows a worthless wild fig clutching a coco-nut tree. In the Tropics nature runs rampant. There is a sharper struggle between the individuals of the vegetable world, but the same fight exists in less degree in temperate climates. It is a knowledge of the forest weeds and the relations of trees to one another and to the sunshine, soil and moisture conditions of a special locality which determines the method of management and the success of the forester in charge.

UNFORTUNATELY for the forestry cause in America there are many of the so-called forestry workers who do not begin to comprehend the meaning of the science. Many believe, for instance, that the planting of trees along city streets is a part of forestry—in fact, the person who has charge of these is often misnamed “city forester.” Foresters have to deal only with forests, and not with trees as individuals, and generally are not much concerned about street trees. By many of those who have studied the subject, the planting of trees along city streets which are not unusually wide is condemned for the following reasons: They shade houses which are already deprived of sufficient sunshine and circulation of air; they are in the way; they litter the streets with leaves

and sticks; they form resting places for sparrows and disagreeable insects, and at best they are miserable specimens, being usually barbarously lopped, with bruised trunks, and often sickly from the ravages of insects or suffering from suffocation due to the dusty, smoky atmosphere and paved streets. Every city should own, however, a communal forest. Many European cities have built theatres, hospitals, libraries, etc., from the proceeds of their forests, which serve all the purposes of, and are far superior to, the ordinary expensive conventional park of an American city.

If the forestry workers referred to would direct their energies from the street trees to the city forest they would be safely within the realm of the subject of forestry and would be aiding in the formation of valuable object lessons.

In speaking disparagingly of tree planting along city streets we have for authority Colonel Waring, of New York City, a well-known expert on such subjects, who has favored us with the following important communication:

Tree Planting in City Streets.

DEPARTMENT OF STREET CLEANING,
CITY OF NEW YORK.
NEW YORK, NOV. 27, 1897.

Editor of the Forester:

SIR,—You ask my opinion concerning the planting of trees in city streets.

I think that trees may properly be used on grassed spaces in the centre of wide boulevards, as in the Western Boulevard of New York, from Fifty-ninth street north.

I fully appreciate the beauty of shade trees in streets in fine summer weather. At the same time, it seems to me unquestionable that, considering all things, and on the average of the year, they do not add to the beauty, comfort or convenience of any street of ordinary width in a closely built city. The littering with their leaves adds something, though not

very much, to the difficulty of keeping pavements clean. Their shade, even in the winter, prevents that rapid drying of the surface which is, especially at that season, most important, and which, unless the street is thoroughly cleaned, is important at all times. In this climate there is another difficulty that seems to me almost insurmountable—that is, that ice and snow lie very much longer under the shade of even the barest limbs than under the direct action of the sun. This, I think, is even more objectionable, from a sanitary point of view, than it is with reference to traffic, which is so greatly impeded by the icy conditions of the pavement.

Very truly yours,
GEO. E. WARING, JR.

THE communication by Susan Blake on the town forests of Andover, Mass., in the last issue of THE FORESTER, was favorably noticed in several newspapers throughout the country. We copy the following editorials from the *Philadelphia Inquirer* and the *Saint Paul Pioneer Press* which were suggested by this communication :

Town Forests.

A communication in a journal that is published in the interests of forestry shows that increased attention is being paid to that subject in many parts of the country. The writer, who is a woman, tells how the citizens of the town of Andover, Mass., have raised two-thirds of the four thousand dollars needed to buy a beautiful stretch of woodland which comprised a part of Indian Ridge, on the edge of the town. The Ridge is the natural pleasure park of the mill people, and on the woodland in question there are oaks, chestnuts, hemlocks and maples, besides some magnificent white pines. A year ago it was learned that the pines were to be sold for lumber, and a movement was begun to secure the woodland for forestry and park purposes.

"The thought of its possibilities," the writer explains, "did not all come at once, but it came very soon. It occurred

to some of us that since all interested wished the woodland kept in its natural beauty, the only care being to keep the forest in its highest perfection, it might be made a useful object lesson to owners of small woodlands, and to the boys and girls in schools, giving them a knowledge they have, as yet, no means of obtaining, and developing an increasing interest in forest preservation."

The town of St. John's, New Brunswick, has carried out a similar undertaking in its vicinity. Paths and roads have been cut through a charming stretch of woodland, and the result is a park in which the natural predominates, and the views that are afforded, outside of the park, are of the most delightful character. There are towns and villages in European countries having forests in their immediate vicinity where the same thing can be seen, and it would be possible in our own State to bring about equally beneficial results in many places. The money to be had by cutting down the "green-robed senators of mighty woods" is as nothing when compared with the sense of beauty that would be developed by maintaining them inviolate.—*Philadelphia Inquirer*.

A Communal Forest for Andover.

From a letter by Susan M. Blake, printed in THE FORESTER of Princeton, N. J., it appears that the public-spirited citizens of Andover, Mass., have raised two-thirds of the four thousand dollars needed to buy a charming stretch of woodland comprising a part of Indian Ridge, and on which besides oaks, chestnuts, hemlocks and maples are some magnificent white pines, for a town forest. Indian Ridge is just on the edge of the village of Andover, and is the natural pleasure park of the mill people close by. The undertaking to secure it for forestry and park purposes began a year ago, and was inspired by the knowledge that the splendid pines on the Ridge were to be sold for lumber. "The thought of its possibilities," says the above-named lady, "did not come at once, but it came very soon. It occurred to some of us that since all interested wished the woodland kept in its natural beauty, the only care

being to keep the forest in its highest perfection, it might be made a useful object lesson to owners of small woodlands, and to the boys and girls in our schools, giving them a knowledge they have, as yet, no means of obtaining, and developing an increasing interest in forest preservation."

This movement in Andover, which it may be hoped will succeed, is one of many indications of the awakened interest in forestry in this country. There are not a few European cities and villages owning forests in their immediate vicinity that yield a handsome annual revenue and are also available for park purposes. Forestry implies that mature trees will be cut when they can be sold to the best advantage, that regrowth shall be promoted and the sustained condition of the forest be always maintained. Where a forest is largely for park purposes and for the public benefit the matter of revenue may become a subordinate feature. — *The Saint Paul Pioneer Press, Nov. 19, 1897.*

The Old Field Pine in New Jersey.*
BY ARTHUR HOLICK IN *The Plant World.*

Until very recently the geographical range of the Old Field Pine (*P. Taeda L.*) was thought to be limited on the north and east by Delaware Bay. In *Garden and Forest* for May 19, 1897, however, Mr. Gifford Pinchot noted the occurrence of a single tree at Town Bank, Cape May county, N. J. This, so far as I can ascertain, is the first record of the species in New Jersey. In *THE FORESTER* for June, 1897, its occurrence there, independent of cultivation, was rather questioned by the editor, and it became a matter of interest to determine if possible whether the

species was native in the locality and whether other specimens were to be found there.

Shortly afterwards I received a communication from Professor John C. Smock, State Geologist, requesting me to go to Cape May and investigate the matter, and I was referred to Mr. Nathan C. Price, of Cape May city, who was supposed to know the location of the individual tree reported by Mr. Pinchot. I arrived there on August 5th and found Mr. Price, but he knew nothing about the *Pinus Taeda* as a species or Mr. Pinchot's tree as an individual, and as I had not, at that time, read the article in *Garden and Forest* describing the locality, I was nonplussed. The outlook for finding one individual tree somewhere in Cape May county seemed very dubious; but, on the following day, Mr. Price drove me around the region, and I maintained a sharp watch for any long-leaved pines. We finally left the road at Cold Spring school house and entered a patch of woodland by means of a well-defined wagon track. The trees were mostly *Quercus alba*, *Q. ilicifolia*, *Q. digitata*, *Q. Phellos*, and *Q. rubra*, with scattered trees of *Pinus Virginiana* and *P. rigida*, and a typical pine barren undergrowth. The first pine met with on the edge of the woods at once attracted my attention, and it proved to be a thrifty *P. Taeda*, some thirty-five feet tall, whose status as a native could no more be doubted than could that of any other tree in the woodland. The search was then continued through many miles of deciduous and pine woods, and although hundreds of other pines with long needles were seen and scores of them were closely examined, they all proved to be *P. rigida*.

The interesting question then arose whether I had by good luck found Mr. Pinchot's tree, or whether I had found another specimen. Subsequent communication between us assures the fact that two trees have been located, quite a distance apart, and leads to the inference that these are not the only ones in the vicinity. In the meantime we may safely add *P. Taeda* to the native flora of New Jersey.

* The note which appeared in the June issue of *THE FORESTER* in reference to this discovery is as follows:

"Mr. Gifford Pinchot, consulting botanist for the Geological Survey of New Jersey, has discovered a single specimen of *Pinus Taeda* in the southern part of the State. If this tree came there naturally it is an interesting discovery. There are two dead pines on Seven Mile Beach which several botanists have supposed were of that species."

We did not mean to imply that this was not a bona fide find, and that the tree did not come there naturally, although, as every botanist agrees, it is often extremely difficult, if not impossible, to determine. At any rate, it is now settled beyond doubt, and further search may not only result in the discovery of several other specimens of this species, but also even of the long-looked-for cypress.—ED.

The Woods of the Bauland.

BY KARL PHILIPP, FORST-ASSESSOR,
FORBACH, GERMANY.

In Baden we call "Bauland" that fertile tract which, beginning near Karlsruhe, extends in a northeastern direction almost to the Bavarian frontier. The geological formation is mostly limestone. The country is undulating, and elevated from 100 to 340 metres above the sea level. The climate is rather mild, and the soil relatively fertile. Agriculture and cattle raising bring good returns to the peasantry. Almost 25 per cent. of the area, i. e. 140,000 acres, is wooded.

The growing stock is mostly composed of deciduous trees as follows:

35 per cent. red beech, 25 per cent. oak, 20 per cent. white beech, 16 per cent. aspens and birch, 4 per cent. pine and spruce.

The larger part of the woods is common property of the villages. One hundred years ago the population being thin and the demands for timber small, the woods were treated under an irregular "femel-like system.*

The growing stock was still quite considerable. In the beginning of this century the woods were divided into thirty blocks, all of the same extent, and the "middlewood" treatment was introduced.†

Every year one block was cut over; nearly sixty cubic metres of the standards were to be left per hectare. In the femel wood the actual amount of timber was equal to the stock of a highwood, treated under a rotation of ninety years, and amounted to 200 cubic metres per hectare. By adopting the middlewood system only 100 cubic metres per hectare were necessary.

*In this system the oldest, largest, and also all defective trees are felled in all parts of the wood. The small holes resulting therefrom are restocked again by the seeds falling from neighboring trees. Generally in a regular interval of 10 to 15 years cuttings take place over the whole wood. Therefore the stocking will always be a very irregular one, and in every block we shall find trees of all age classes mixed together. The German words "femel," "ausfemel" are derived from the Latin "feminum," and are taken from the hemp culture where the male plants are plucked out whilst the female ones are left standing till the fruits have ripened.

†"Middlewood" (standard-coppice) is a combination of coppice (underwood) and seedling trees (standards or overwood). The coppice is treated by areas under a rotation of 10 to 30 years; the standards are left standing till they reach the dimensions of merchantable timber.

Therefore the conversion of the femel-like highwood into middlewood consisted at first in reducing the growing stock to half its former amount; needless to say the revenues increased considerably; it was soon forgotten that as a matter of fact the wood capital was being consumed, and the high yields were ascribed to the new wood treatment. Even in the year 1857 we read in an official report:

"A few highwoods excepted the forests are tended as middlewoods generally in a rotation of 25 to 30 years. The middlewood system is here in a very fit locality. It has lasted for a long time, and yields large crops and revenues, so that it is very doubtful whether the yield of the high forests would be a greater one. The wood-owners are satisfied, and have, from a pecuniary point of view, no reason for exchanging such a profitable management, (requiring only a small normal stock) for the highwood treatment, which must be provided with double or even a greater normal stock. The red beech can be treated as coppice forest for a long time, regenerating itself naturally, liking an admixture of aspens, up to one-quarter or even one-third of the underwood mass.*

"Among the standards the oak thrives best, and is also most esteemed. The mass of standards left per acre varies from 15 to 20 or even 25 cubic metres; not only single oaks, but also whole groups are spared. After the oak the pine is the most valuable standard tree, and grows up to very large and valuable boles."

Formerly the growing stock consisted mostly of red beeches, with oaks and very few white beeches, aspens, birches, shrubs, etc. The red beech having a too dense foliage, so that the underwood could not thrive under its shadow, it became a principle to replace it progressively with oaks, white beeches, and pines. Where this measure was carried into complete effect, of substituting for the beech light foliated standards, only very bad results followed. Aspens, birches, willows, and shrubs took hold of the ground. It was

*"Underwood" is the coppice wood; "undergrowth" is the young growth naturally regenerated in a highwood.

soon recognized that the soil was undergoing a great change. Humidity decreased, the cover of organic mould became exhausted, and the soil, parched by sun and wind, became densely covered with grass and weeds. The standards deteriorated in growth, and the planted young saplings of oak and white beech perished.

The precious oak stems we now see in the "blocks," the soil of which is so much reduced in yield capacity, were produced in the irregular highwoods, intermixed with red beech, for the latter preserved the moisture and increased the mould cover by its dense canopy and its rich leaf masses. If there is no protective humus cover, the limestone, rent by many crevices and fissures, allows the rain to quickly sink into the subsoil, unless prevented by impervious strata of loam which would give rise to stagnant water.

The middlewood does not find here the natural moisture that exists in the lowlands of rivers, where it is allowable without permanent harm to expose the soil to sun and wind at short intervals of 25 to 30 years.

If the middlewood treatment had been continued it would have become more and more difficult to satisfy the wants of the communities. The inherited wood stocks were consumed before their eyes; the system in use failed totally in raising young standards. Already there were compartments to be cut over, where, excepting some old oaks, the crop consisted only of aspens, birches, shrubs, etc.

The damages produced by giving up the former femele-like system and adopting the unfit middlewood treatment were sufficiently obvious even 25 years ago to warrant a desire for amelioration.

First, at every renewal of the working plan they endeavored to lessen somewhat the crop hitherto too highly taxed, and to leave as many standards as possible on the areas to be cut over. Finally the crop heretofore determined by the area was now computed by the cubic wood mass, based upon the real yield capacity of the soil.

By this measure the fetters of the old

areal system were broken, and the conversion into the highwood system began.

The great expense of planting and seedling, not to be demanded from poor villages, was still the principal hindrance in many cases.*

Not till the year 1888 did a definite change take place in many forests. In this year the red beeches produced such enormous quantities of seeds as will not happen again for several decades, and wherever this desirable species was still preserved the young seedlings shot up abundantly. In many places the sole task of the forester was to use the gifts of nature in a proper manner in order to approach the wished-for end without great expenditure. To explain the method of converting the irregular forests, thus far improperly treated into a better state, I shall describe some characteristic woods, and explain the manner of their present management.

There will in reality be many phases in the transition which will demand varied treatment. Whoever has acquired experience will soon be able to discover the proper treatment for a special case, and adapt his methods of cutting and planting to the actual conditions.

As already mentioned every wood is divided into thirty equal compartments. Every year until now one block has been cut over i. e., the coppice wood totally cleared, and 0.6 to 0.7 per ct. of the cubic mass of the standards allowed to remain. The bare spaces were generally planted in oaks, destined to form the future standards. The age of the undergrowth varies by one year from block to block, and ranges from one to thirty years. The standards of the youngest compartment are from 30 to 90, those of the oldest from 60 to 120 years of age. The blocks are ordinarily named from the age of the coppice; thus we speak of a block one year old, of a block twelve years old, etc., of young and old compartments, without any respect to the standards.

In the young blocks the ground is open

*In Baden the forests of the communities are managed by officers of the state. The working plan is renewed every ten years. Large discrepancies between revenues and expenses are carefully avoided as having great influence on the communal budgets.

i. e., not shaded by a dense wood stand. Weeds will therefore thrive, and get hold of a good deal of the area during the first five years after the cutting; growing older the coppices will close and overshadow the weeds. At the same time the crowns of the standards will be extending laterally more and more, so that after a lapse of ten years, conditions being normal, weeds will be overwhelmed.

The mould covering, quickly decayed by the free entrance of light and air, is renewed from fallen leaves, and increases from year to year. Taking for granted some forestal insight, it will be evident that the condition of the oldest block as to stock and soil resembles most the close highwood, and that all forestal measures of conversion should have their beginning in the oldest i. e., 25 to 30 year old blocks. Where the managers did not have this insight bad results followed in spite of great expenses. I shall now give an explanation of some special instances.

(1) Description of compartment.
Standards: Red beeches and oaks, 60 to 120 years old, rather regularly distributed over the area, some scattering birches and white beeches, 60 years old, ranging from 60 to 65 centimetres in diameter (breast high) and 15 to 25 metres in height; cubic mass more than 100 cubic metres per ha, wherein are more than 70 cubic metres of red beeches per ha.

Underwood: 25 to 30 year old coppices of red and white beeches, oaks, with some birches and aspens, ranging from 10 to 20 centimetres in diameter, and 8 to 14 metres in height.

The wood is dense, the normal increment in regard to the beech 4.5 to 5 cubic metres per ha. These conditions are the most favorable ones for conversion, as natural regeneration is at all events guaranteed by the great number of red beech seed trees on a large part of the area. First, the underwood should be thinned out rather severely; stunted standards i. e., mostly white beeches, are culled out at the same time. Hereby we have attained what is called preparatory cutting in regular highwoods i. e., the soil is fitted to receive the seeds. In a seed year the growing stock is cautiously

opened. Gradual working is strongly recommended, since the soil is very much inclined to get weedy. Cuttings are therefore only continued to procure light and air for an undergrowth already existing. After a lapse of 15 to 20 years natural regeneration of the beech may be completed.

But working in this manner a pure red beech forest would be the result. The admixture of oak would for the most part be a very small one, because the oak demands a quicker succession of regenerative cuttings. In order to produce a young forest, where valuable deciduous trees i. e., oak, ash, maple, elms, and coniferous trees are intermingled with beeches, we must apply the artificial help of seeding and planting.

Oak is introduced best by seeding; to do this acorns are laid here and there irregularly in the most fertile localities or in regular furrows prepared with the grubbing hoe amidst the newly germinated red beeches.

Planting is rather difficult and expensive, as the young oak has a very long tap root. The young saplings not being able to endure the shadow of the standards for a long time, the old stems in these places should soon be removed.

Ashes, maples, and elms are always introduced by culture in whole groups. For this purpose, in the blocks to be regenerated during the next ten years, little gaps one-sixth to one-third of an acre are cut in the forest and planted. This method is named "pre-regeneration."

If later on the beech is regenerated, the ashes, elms, etc., having already considerable advance in height growth, cannot be suppressed.

Two dangers must not be overlooked, frost and grass. It is a well-known fact that in gaps the frost danger is greatest, the young plants missing here the protection of the parent trees. In hilly regions there are everywhere localities especially endangered by frost, called "frost holes." These may be easily observed and avoided.

Grasses and weeds threaten our cultures in all middle woods, and prove very obnoxious. Sometimes the ground is so

matted by them that rain can no longer soak into the subsoil, and the planted seedlings perish from drowth.

The only remedy is to loosen the surface soil. The development of saplings is hereby so promoted that they soon close together and suppress the former foe.

Among the conifers the silver fir requires some care. Apart from its good sylvicultural qualities it must be preferred to the spruce in mild climates, where the latter is often affected by insects. Very sensible to frost the silver fir is not cultivated in open places, but introduced during the preparatory stage.

As its growth during the first period is very slow, and the small seedlings are easily choked by beech leaves, seeding is only exceptionally resorted to.

For the protection of the young seedlings the earth is thrown up in strips, 20 centimetres high, 50 centimetres broad, and 1½ metres apart from one another. Most of the fallen leaves will then be blown by the wind into the little depressions.

Ordinarily silver firs are grown in nurseries, and planted at five or six years of age in groups under the slightly opened

Spruce is specially adapted to filling up frost holes.

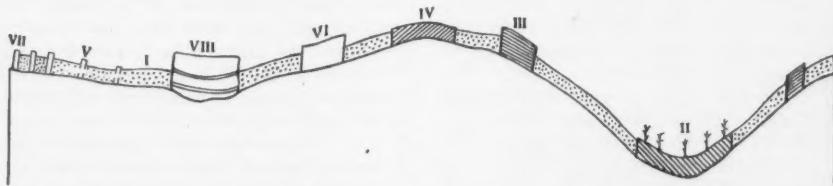
Pine, which forms very valuable stems when mixed with beech on good soil, may be seeded in small groups everywhere. The stump holes of the old oaks, which are generally not felled with axe and saw but grubbed out in order not to lose a part of the precious stem, are very suitable pine-seeding places.

It is evident that the manager may increase or diminish the percentage of the species to be mixed; the number of plants that can be fostered in the nursery, and the amount of money stipulated in the budget will always have a great influence thereupon.

In converting an ill-treated middlewood into a regular highwood, we must not expect the fulfilment of an extraordinary ideal, but should be contented with a result to be reached with moderate outlay.

The natural regeneration of beech and the cultures accomplished, the young growing stock will show the following appearance after the removal of old standards and coppices. (See cut.)

(2) Description of block. *Standards:* White beeches and birches, 60 to 90



I. Beech; naturally regenerated. II. Spruce; planted in a frost hole, with some sheltering coppices. III. Silver Fir; planted groups. IV. Pine; planted or seeded on a dry ridge. V. Pine; seeded upon stump holes. VI. Oak; planted group. VII. Oak; seeded in furrows. VIII. Ash; group planted, in a moist deepening.

beech stock. The groups are gradually freed from the overshadowing standards.

In every natural regeneration, here and there, smaller or larger spots will remain unseeded. After the renewal of the old trees these blanks must be planted with spruce and pines.

These coniferous trees develop very quickly in their youth, and will therefore soon overgrow harmful weeds and coppices that have got hold of the ground.

years old, with oaks and red beeches from 90 to 120 years old; some scattering pines, diameters and heights are the same as in (1); mass 60 to 80 cubic metres per hectare; herein 10 to 20 cubic metres red beech per hectare. *Underwood:* Coppices of white beech with aspens, oaks, birches, and shrubs; mass 40 to 70 cubic metres per ha.; here and there are little blanks.

The smaller the percentage of red

beech the more difficult it will be to regenerate a part of the area naturally, as corresponding to the decrease of this species conditions of the soil have deteriorated. Nevertheless the natural reproduction will be possible on one-fifth to one-third of the area. At first small gaps are cut and planted with valuable deciduous trees, or the growing stock is slightly opened to introduce silver firs into all fertile places where the red beech has disappeared.

In a seed year the stock is opened up freely around the groups of old red beeches.

If the condition of the soil is no longer good the use of the grubbing hoe will be of great service in facilitating the germination of the acorns.

The underwood is but slightly thinned, and in all places where we neither plant nor regenerate, it is indispensable that the stock remain densely closed so that the light does not reach the ground.

If we should find large places covered with unmixed white beech coppice, where the ground is still clear of grass, an undersowing of acorns and beech nuts will be cheaper than planting. Before seeding, one-third to one-half of the coppice wood should be thinned out. Further cuttings follow according to the demands of the young seedlings for light and air.

Promoting the conversion in the manner indicated, i. e. by natural regeneration, group planting and undersowing, a young seedling wood will be established on one-half to two-thirds of the area. The remainder must be converted by planting conifers, mostly spruces. This is done in the following manner: The underwood is severely thinned out, from one-third to one-half of the mass is removed. On every stump two or three sprouts are left. Then this thinned stock is underplanted with healthy five-year-old spruces already once transplanted in the nursery. When the spruces have reached a height of about 1 metre the overshading trees, both standard and coppices, are removed by several cuttings. If we began by clearing totally and then planted up the area, the young spruces, besides being endangered by frost and heat, would soon

be subdued by the coppices of the old stumps.

When the spruces have reached an age of 10 or 12 years, where a quick height growth is setting in, they are no longer menaced by the coppices after the removal of the trees to be cut; these sprouts, on the contrary, provide for the early shading of the ground; weeds will be suppressed, and the height growth of the spruces will be accelerated. Here and there we shall find a chance to bring some groups of pines into the future stock.

(3) Description of block. *Standards:* Oaks, 90 to 120 years old; birches and white beeches, 60 years old; some pines, poplars; cubic mass, 50 to 60 cubic metres per ha. No red beeches!

Underwood: Aspens, with birches and a few white beeches, 25 to 30 years old; mass, 30 to 70 cubic metres per ha.

The kinds of trees composing the standards are those that were considered the best forty years ago. But what are the consequences? The soil is very often in a miserable state; natural reproduction is absolutely impossible. The whole area must be ceded to the conifers during the next rotation. The best method will be that above mentioned,—the underplanting of spruces. In order to avoid future damage, the heaviest standards are first to be removed; the underwood, which is not likely to have grown up densely, needs only a moderate thinning. By two or three cuttings, following one another at intervals of three or five years, the block may be cleared.

(4) Description of block. *Standards:* Pines, with a few oaks, 60 to 100 years old; standing single or in high-wood-like groups.

Underwood: Thorns and shrubs of different ages.

The soil has only a small yield capacity.

Natural regeneration is excluded. The only remedy will be the radical plan of clear-cutting and furrow-sowing of pines. Since, with advancing age, the stock loses quickly its density and the soil deterioration is not to be hindered, these compartments must be treated under a rotation of but 50 to 60 years.

The crop established, a proper system of cleanings is to be applied, lest the success already won become dubious again. The cleanings are made to protect the cultures and young beech seedlings from the quick-growing coppices and weeds. Cleanings only yield a material of inferior value ; the cost of the crop is not repaid by the money returns ; therefore, it is an expense that must be added to the costs of culture. A reasonable manager will endeavor to reduce the cost to a minimum.

For the cases considered here some general rules can be given :

(1) During the first ten years one to three of the shoots sprouting from the old stumps are to be left ; the other ones are to be cut back to half a metre high. If we should cut them off directly above the stump, from three to five new sprouts would spring up for every coppice cut ; poplars and aspens would, at the same time, produce a great number of troublesome suckers.

(2) In many cases the premature cutting of the coppices turns out to be harmful, by promoting the growth of weeds and grass.

(3) In the culture of conifers, coppices and aspens often fulfil the end of protecting the planted seedlings. If, for instance, in a frost hole planted up with spruces, aspens and birches coming up by themselves, are left, they will soon overgrow the spruces and shelter them from frost and heat. The culture will easily endure this light shade. After a lapse of 10 to 15 years aspens and birches are removed and will then yield a substantial net income. In many places the birch, before being cut, will yield returns from its trimmings, as its fagot is in demand for brooms.

(4) In all compartments destined for regeneration there arehursts of aspens and birches of different sizes in bare spaces and gaps. As already stated, these must be underplanted with conifers. During the period of regeneration the boundaries of these husts are to be kept as dense as possible, in order to hinder their enlargement.

(5) On dry ridges where the pine alone

will thrive, coppices of every kind are to be preserved. The pine will outgrow them in a short time. Later on they will play the rôle of the soil-protecting underwood.

From the above mentioned cases it may be seen with what care and intelligence cleanings are to be executed. The wardens, whose duty it is to control the workmen, must be thoroughly instructed. The work itself is only to be done by reliable wood-choppers. Otherwise much money will be spent unnecessarily and more harm than benefit is done to the forest. I believe the management of the middle-wood blocks of from 25 to 30 years old is sufficiently explained, and now turn to the younger compartments. The work of the forester is here a very limited one.

In those blocks formerly well planted, the young saplings of oak and ash may be preserved here and there by cleanings; but these measures are seldom necessary, since most of the former cultures have totally failed.

The blocks 15 to 25 years old are to be thinned every 8 to 10 years. The cubic mass cut per ha. will amount to from 10 to 25 cubic metres. Thinning must be done very moderately and cautiously, since the soil must remain shaded. Special care is called for in all blocks, or parts of blocks, that are wooded only by aspens and birches. These species, though only 15 to 20 years old, cannot keep the ground free from grass. Such damage should not occur in a wood properly converted. Every deterioration of the soil must be corrected in its beginning by under-planting with spruce and silver fir. If such a block is systematically regenerated, in 20 or 30 years beautiful groups of conifers are found there and may be incorporated in the young beech stock to be established. The period of conversion will extend to 60 or 80 years. In the beginning, the rotation of the newly-established high wood is fixed at 80 years. It may probably be that later on a rotation of 100 years will be introduced by a gradual sparing of a part of the increment, in order to accumulate the necessary higher amount of growing stock. At present the annual average crop is 3 cubic metres per ha.;

the actual increment, as to oak and beech, may be estimated at 4.5 cubic metres per ha. The new-formed high wood of deciduous and conifers mixed, may produce a mean increment of 5.5 cubic metres per ha. The difference between accretion and crop is partly saved to complete or augment the stock; partly used to pay the construction cost of a systematic network of roads.*

As characteristic sections where the above described wood may be studied, I mention Neckarbischofsheim, Adelsheim, Buchen, Boxberg and Bödigheim. The latter one, private property of the family von Rüdt, shows the process of conversion in a stage already more advanced, as the old system was abandoned here 45 years ago, i. e., at a time when, in the woods treated by the State, false principles were followed. Such penetration, on the part of a private wood-owner, into forestal matters, is even nowadays very rare in Germany and merits general approbation.

These forests also give a good opportunity to study the behavior of the silver fir stock on a limestone formation. This species forms here sound and heavy boles which cannot be surpassed in the Black Forest.

Some months ago, in this periodical, I described the treatment of the irregular coniferous woods in the Black Forest. Now I have tried to explain the forestal principles that are at present adopted for irregular deciduous forests in an extended woodland. I believe that in the north of the United States there are similar wood conditions in vast tracts and that as soon as a methodical exploitation is introduced, a number of these principles, of course properly modified, may be successfully copied. Undoubtedly, a visit to these forests would be a rich source of instruction to all who are interested in German methods. The treatment of these woods will also prove that the forester is not able to make show of quick successes,

*For instance in a given forest of 100 hectare the annual rate of growth or accretion would amount to 7 cubic metres per hectare, therefore there would be a growth of 700 cubic metres. If only 5 cubic metres per ha—or in all 500 cubic metres are cut as crop, the increase of increment would be annually 200 cubic metres, which is the difference between accretion and crop.

and that real, great amelioration cannot be accomplished save by the continuous work of several generations.

The silvicultural efforts of a single manager will always have a modest influence in the present, and the fruits will only ripen for future generations, who shall have forgotten the name of the benefactor.

Whoever considers these conversions, however superficially, will drop many prejudices, particularly the wide-spread opinion that the failings of the present generation toward the woodlands of the nation have no serious consequences and can be soon repaired in future.

The Swamp Magnolia.

The illustration of *Magnolia glauca* in *Garden and Forest* for October 13th is as near perfect as a picture can be. So true and suggestive is the likeness that possession of the picture is almost equal to the presence of a bouquet of the flowers and leaves of this beautiful tree. This species of magnolia is so abundant in the swamps of Southern New Jersey that its fragrance is perceptible in passing on the train. Its flowers are collected in large quantities and sold in neighboring cities. Many persons are thus actively employed during its blooming season, and there is reason for believing that the income thus gained equals that from any timber tree of the region. It blooms at such an early age, produces such quantities of flowers, and thrives on such inexpensive land, that planting it on a large scale for profit has often been seriously considered, but never as yet accomplished, in Southern New Jersey.

The "Centralblatt für das gesammte Forstwesen" of Vienna, Austria, for November, 1897, contains the first part of an exhaustive review of the "Timber Pines of the South," by Mohr and Roth.

A few sets of from 25 to 40 White Mountain Plants for sale at about cost of collection. Specimens are mostly alpines and will be poisoned and carefully labelled. For particulars and list address Newlin Williams, 3306 Race street, Philadelphia, Pa.

Acknowledgment of Publications Recently Received.

Among the publications recently received these are worthy of special mention: "Ziekten en Beschadigingen der Kultuurgewassen," a book on injurious parasites, in the Dutch language. By Prof. Dr. J. Ritzenbos, the distinguished director of a laboratory of vegetable pathology in Amsterdam, Holland. Floods. By Dr. Kern, a Russian forester. Unfortunately the knowledge in this volume is locked up in the Russian language, but judging from German and French reviews of the book, and the abundance of interesting and instructive illustrations, it is safe to conclude that it is an excellent work.

Annual Report for 1897 of the Clerk of Forestry for the Province of Ontario.

Compilation of Public Timber Laws and Regulations and Decisions Thereunder. Washington, 1897.

The Possibilities of a Maple Sugar Industry in Western North Carolina. By W. W. Ashe. This is the first of a series of economic papers to be issued by the North Carolina Geological Survey. Mr. W. W. Ashe, Assistant in Forestry to the Survey, and Secretary of the North Carolina Forestry Association, which has been recently formed, in the production of this pamphlet has added a valuable contribution to modern American forestry literature. This is not, like a great deal of our forestry literature, a rambling dissertation on the beauties and value of the forest, the effects of forest fires and the stupidity of our Legislatures, but a plain, straightforward account of the maple sugar industry, in which he gives the natives of the mountains of North Carolina in short space all the information they need in order to conduct the business properly.

Report of the Massachusetts State Board of Agriculture on the Work of Extermination of the Gypsy Moth. January, 1897. This report gives additional information in reference to the praiseworthy work of the State of Massachusetts in exterminating this pest. The whole country should be grateful to this commonwealth for the persistent way in which this insect has been fought and its dissemination into neighboring States prevented. The seriousness of the insect pest question increases every year, and too much time and energy cannot be spent in this work. Experts should be kept constantly at work studying the life histories of these pests, devising and executing means of extermination.

Being the last issue of this journal under the present management, we desire to give expression to the pleasure and profit derived from the exchanges and publications which we have received, and to thank all those who have thus favored us, and particularly those who by special mention have encouraged our efforts.

Black Gum Logs.

Southern gum cut into veneers is being used extensively in the manufacture of sewing-machine tables. It is favored from the fact that it is a close fibre wood, holds screws nearly as well as the best oak, takes less glue and sustains a high polish. A great deal of this stock is cut at Cairo for the Singer Machine Company. Five sheets of this gum wood are put together, a spread of glue between every two sheets. The five are arranged in straight and cross grain alternately. The press comes down with forty tons weight, bringing the five thicknesses of glued veneer together. Three hours' confinement completes the cohesiveness. The machine table is made and it is stronger than that inch thickness of board in almost any other solid wood. It will not warp, and it cannot crack. A broadaxe will not divide it. The alternate grain gives it a toughness that beats nature. This is what the trade calls "built-up" wood. It is better than solid oak.—*Lumberman's Review*.

**UNIVERSITY OF WASHINGTON,
SEATTLE, WASH.**

Editor of the Forester:

If any one should desire some of the seeds of Puget Sound plants and will address me in care of the University of Washington, Seattle, I will be glad to send the seeds as long as my collected supplies last, and next year this correspondence may prove of mutual advantage, as I expect to collect more kinds of seeds in large quantities. In exchange I want seeds of all kinds of plants that will thrive in this climate. The University of Washington has an arboretum of 355 acres. As yet there are but few plants growing upon it except those found native there, and it is the purpose to make it a scientific botanical garden by the introduction and care of other species of plants.

Very truly,
EDMOND S. MEANY,
NOVEMBER 26, 1897.

A variety of the Big Tree in cultivation has a name commensurate with its size: *Sequoia Washingtoniana glaucescens paramido-compacta*.



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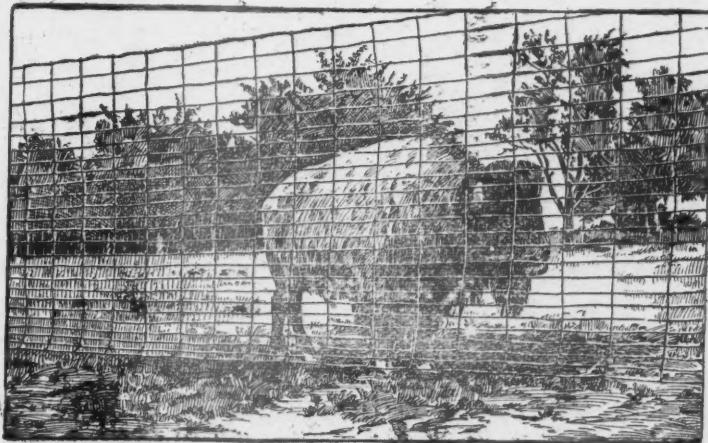
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